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§ 262. Some rambling Notes on Collecting and Preserving
Herbarium Specimens.

V. **Drying Specimens**, *continued*—Our design in this article is to describe, with some detail, the common method of drying specimens, particularly the writer's mode of procedure. In this account he hopes will be found a full answer to those queries which have from time to time been submitted to him, and to whose propounders he now apologizes for any lack of courtesy he may have shown in not giving their polite inquiries an earlier and, perhaps, a more direct reply.

The *driers* or *drying* papers, which we shall describe first, are equally necessary to both ways of curing specimens, though by the wire-press not so many are required. Paper having the quality of imbibing moisture quickly should be used for this purpose. Some kinds of wrapping-paper—usually of light or grayish color—answer very well. Most newspapers are good. Common blotting-paper is admirable, in case you obtain sheets of sufficient size, although it is rather expensive. An excellent quality of drier is sold by several houses who deal in goods relating to natural history, among which is the Naturalists's Agency, Salem, Mass. These driers cost at Salem \$5 a ream, which price, with freight or expressage added, makes a moderate outlay to purchasers living at a distance, but the driers are durable and, with careful usage, will last through many collecting seasons.

I have used with great satisfaction these Salem driers, and also, with quite as good success, my own prepared driers or packets made of newspapers. There may be a slight difference in favor of the former; but even with plenty of extra driers on hand, I use these packets largely, for I find them quite indispensable in pressing coarse and succulent plants.

These packets are made in the following manner. I select such newspapers as are more bibulous. The bibulous quality can be readily ascertained by letting a drop of water fall on the paper; the more quickly the water is absorbed the better the paper for drying purposes. I take two papers of the size of the *New York Tribune*,—the paper of which absorbs nicely and also folds to the size of the Naturalist drier, 18 by 12 inches,—fold them evenly, and fasten together at two of the corners with *McGill's eyelet paper-fasteners*, or else by stitching with a strong thread or cord. This gives me a packet of 16 leaves, which I find the size best adapted for most purposes, although a portion of the packets may be made of 8 and 12 thicknesses. The stitching can be done very expeditiously with a sewing machine. Newspapers of other sizes, can be folded as near the dimensions as possible and then cut to the required size. Wrapping or other paper, if used, should be made, for convenience, into packets like the newspapers.

It is well to have on hand a good supply of drying paper. I have generally found use during the season for three reams of Naturalist driers and nearly half as many packets. Unless you wish to collect liberally for exchanges, you can probably get along with a third of that quantity, or less. Still you will find it poor economy to

straiten yourself in this respect, for a good pile of surplus driers never comes amiss on returning from a fruitful botanical excursion, nor during a period of cloudy weather. These remarks are equally applicable to *specimen paper*, which I described and insisted on under "*Outfit*." Lay in sufficient stock of this paper before the collecting season opens, as you can buy it much cheaper in quantity. By a rough estimate from the writer's experience, nearly half as many specimen sheets, for the season, will be required, as the number of specimens to be pressed, in that period: if you expect to dry 5,000 specimens during the season, you will generally want about 2,500 sheets to do it with. Less new stock will be required each successive year, as the old sheets, out of which the specimens were taken in winter for mounting and exchanges, are good for the coming season.

Next provide yourself with a dozen or more pieces of board, 18 inches long and 12 inches wide. They are used at the top and bottom of the pile when pressing, and also for dividing the pile into suitable divisions,—separating the packages of plants which were put in press at different periods, and dividing up the packages themselves if too large. Painted binder's-boards may be used instead of common boards if more convenient to obtain. Instead of either of these, some collectors use a kind of lattice arrangement, the size of the driers, made of two layers of thin strips or laths, nailed across each other. They claim that it permits the circulation of air in the piles and so hastens drying. But when the driers are changed regularly, I have been unable to find any especial advantage in its favor.

For giving pressure various ways have been contrived. The screw press is convenient and compact, but otherwise objectionable, for, although we may give the correct amount of pressure at the outset, (but in fact it is generally too great at first,) yet, as the plants shrink in drying, they will fail to receive the required pressure. This objection does not apply to the lever press, but all that the writer has ever seen, are unwieldy and inconvenient. It is possible, however, some forms of this press might be used with advantage by our less muscular botanists, as it could be so arranged that 10 or 15 lbs. might be made to give a pressure of 50 to 100 lbs.

Fortunately one of the best forms of the drying press, as well as the simplest and cheapest, is merely a board with weights placed upon the top of the pile of specimens. Here, by the simple gravitation of the weights on top, the pressure is continued, and constantly follows up, or rather *down*, the shrinkage of the plants. The weight on a pile should vary from 25 to 100 lbs., according to nature of the specimens and the quantity in the press at the time. On an average 60 lbs. is sufficient for most plants,—rarely should it exceed 75 lbs.; with more than this there is danger of crushing the more delicate parts of the flower especially, and consequently impairing the scientific value. Plants requiring most pressure may be placed at the bottom of the pile, where, in addition to the regular weight, they will have that of the pile above them. From an erroneous idea that the colors are better preserved by using great pressure, some botanists are in the habit of applying as high as 200 lbs. weight to their spec-

imens. Such a great weight is certainly prejudicial to the scientific excellence of their specimens, crushing and jamming together in an undistinguishable mass all the tenderer portions, while all the external excellencies for which they sought could have been fully secured by the moderate pressure recommended.

To supply the weights, various heavy articles may be used, as bars of iron; a number of stones weighing from 10 to 50 lbs. each, and roped for convenience of handling, if desired; boxes filled with sand, stones, old iron; etc. The writer has half a dozen or more old fashioned scale weights, with their rings remaining, weighing 14, 28, and 56 lbs. respectively. These, with stones, he finds answer every purpose.

In preparing a package for the press, first lay down two driers, then put on a sheet with specimens, next two more driers, then another specimen sheet, and so on. The number of driers interposed between the sheets of specimens will depend on the thickness and succulence of the plants. On an average two driers are sufficient, but if the specimens are coarse and fleshy, more will be needed,—a *packet* with the driers, or even more packets in drying certain plants with thick stems, large heads, etc. If these packets should not be at hand, uniform pressure may be secured by placing thick strips or cotton batting about the edges of the package. Ringlets of cotton may be used for some of the larger headed *Compositæ*, if perfect flower specimens are derived. With a little care in adjusting the larger specimens in the package, so that the thick parts are not too much above each other, and with the use of newspaper packets, I have very rarely found it necessary to employ thick strips or cotton to secure an equable pressure. In plants containing little moisture, and in those which part with it readily—as the sedges, grasses and many of the ferns and aquatics—one drier between the specimens, after the first 24 hours, will be all then required, as it will in most of the other plants after the third day, especially if the driers are changed as directed.

For the press recommended, with weights at top, the pile should rarely be carried higher than 18 or 20 inches; if carried much beyond this point, the pile is apt to become shaky and the pressure unsteady: better start another press to hold the surplusage. It is also well not to make the various packages or sections which compose the pile too large,—not over 6 inches in thickness, the writer's are seldom over 4 inches,—as the plants dry better in small packages on account of the pressure being more evenly distributed.

§ 263. New or Little-known Ferns of the United States.

No. 5.

In the first part of the "*Ferns of North America*," when speaking of *Asplenium serratum*, I made the observation that "it can scarcely be rash to hazard the conjecture, that there are yet in the swamps and hummocks of Florida more undiscovered tropical ferns to reward the diligent explorer." I now have the pleasure of announcing a four-fold fulfilment of this prediction.

12. *Ceratopteris thalictroides*, Brongniart.—This plant, which is one of the most peculiar of Ferns, was discovered last July by Dr.